

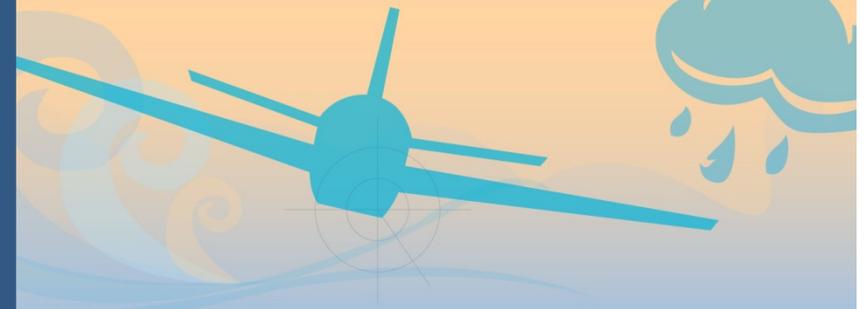
Enabling Information Sharing thru Common Services

Federal NOTAM System (FNS) Enabling NOTAM Modernization Through Information Management Standards

Presented By: Shaelynn Hales, CNA
Date: August 30, 2011



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Administration



Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)

August 30, 2011 - September 1, 2011
NOAA Science Center & Auditorium
Silver Spring, Maryland



Introduction / Agenda



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AIXM, WXXM and FIXM)

- Digital NOTAMs
 - Concept for NOTAM Modernization
- NOTAM Scenarios
 - Foundation of International Standards
- Federal NOTAM System (FNS)
 - End to End Demonstration: NOTAM Collection through Distribution



EUROCONTROL



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Framing the NOTAM Problem



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- NOTAM Originators experience **significant delays** between the time they observe and report the **hazard condition** and when the NOTAM is **issued** to the aviation community
- NOTAM Users experience an **overload of information** that is **not easily managed** to provide them with the critical real time information on the NAS **relevant** to their needs



Addressing the NOTAM Problem



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AIXM, WXXM and FIXM)

- FNS can help address the delay issue by **collecting the information at the source** in a **standard manner** that can be **validated and published**



- FNS can help address the issue of providing **relevant information** to end users by leveraging the **standardized inputs** that can be **parsed and understood**

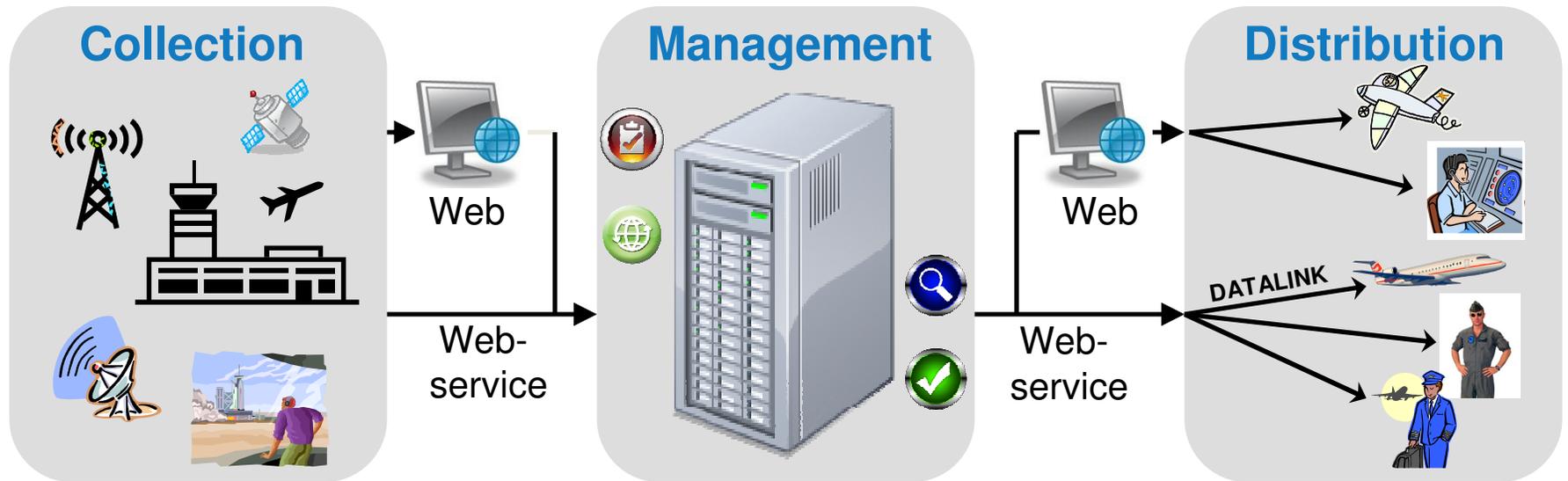


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NOTAM Modernization Concept of Operation



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Originate NOTAMs at the Source

Digitally Capture
Temporary Hazard
Information

Integrate Permanent and Temporary Information

Apply Business Rules,
Validate Data,
Translate, and Publish

Distribute NOTAMs to the Users

Electronic Distribution to
FAA customers,
Computer Readable



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FNS User Benefits



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Benefits for the NOTAM Originator

- Quick and easy issuance of NOTAMs
- Improved NOTAM management
- Standardization of NOTAM inputs
- Intuitive user interface
- Instant validation feedback
- Higher quality NOTAMs



Benefits for the NOTAM User

- Improved NOTAM understanding through standardized information
- Increased situational awareness
- Improved decision making
- Advanced capabilities
- Higher quality NOTAMs



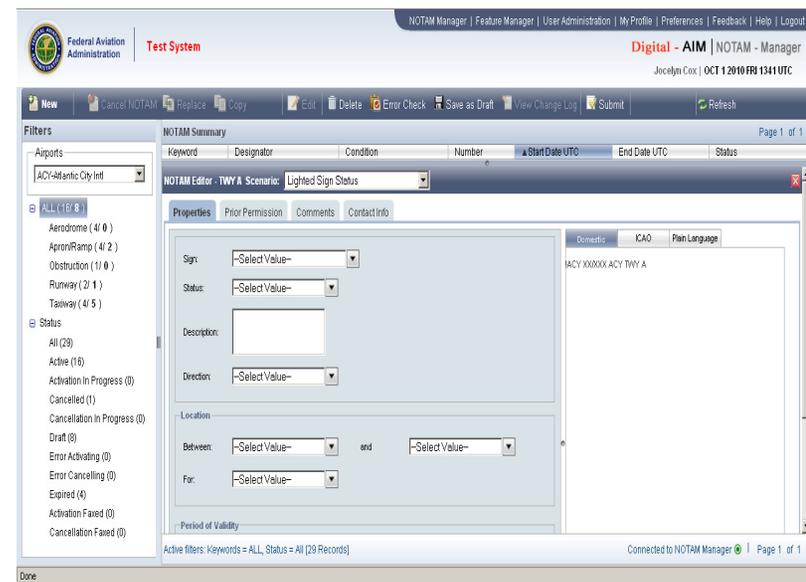
FNS Foundational Concepts



- Standards Based
 - Aeronautical Information Exchange Model (AIXM)
 - Open Geospatial Consortium (OGC) Web Services
 - Service Oriented Architecture (SOA)
- Business Processes Reengineering
 - Digitization of Aeronautical Information at the Source
 - Direct Digital Capture



```
- <AirspaceUsageTimeSlice gml:id="VID014">  
+ <gml:validTime>  
  <interpretation>TEMPDELTA</interpretation>  
  <sequenceNumber>1</sequenceNumber>  
- <isComposedOf>  
  - <AirspaceLayerUsage>  
    <activity>UAV</activity>  
    <statusActivation>ACTIVE</statusActivation>  
  - <concerns>  
    - <LevelAndTimeBlock>
```



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What is a Digital NOTAM?



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- Digital NOTAM Definition
 - A dataset that contains NOTAM information in a structured format
 - Fully interpreted by an automated system without human intervention
- Characteristics of Digital NOTAMs
 - Geo-referenced
 - Temporal
 - Linked to static data
 - Transformable
 - Query enabled
 - Electronically distributable

AIXM (XML) Message

```
<aixm.designator>ACY</aixm.designator>  
<aixm.name>ATLANTIC CITY INTERNATIONAL AIRPORT</aixm.name>  
<aixm.locationIndicator>CAQ</aixm.locationIndicator>  
<aixm.designator/ATA>ACY</aixm.designator/ATA>  
</aixm.AirportHelicopterTimeSlice>  
</aixm.timeSlice>  
<gml.validTime>  
<gml.TimePeriod gml:id="CY01_TS02">  
<gml.beginPosition>2010-01-15T09:00:00</gml.beginPosition>  
<gml.endPosition>2010-01-16T09:00:00</gml.endPosition>  
</gml.TimePeriod>  
</gml.validTime>  
<aixm.interpretation>TEMPDELTA</aixm.interpretation>  
<aixm.sequenceNumber>13</aixm.sequenceNumber>  
<aixm.availability>  
<aixm.AirportHelicopterAvailability gml:id="ACYAVAIL_02">  
<aixm.annotation>  
<aixm.Note gml:id="CY01_TS02_NT01">  
<aixm.propertyName>operationalStatus</aixm.propertyName>  
<aixm.purpose>REMARK</aixm.purpose>  
<aixm.translatedNote>  
<aixm.LinguisticNote gml:id="CY01_TS02_NT02">  
<aixm.note lang="en">due to snow</aixm.note>  
</aixm.LinguisticNote>  
</aixm.translatedNote>  
</aixm.Note>  
</aixm.annotation>  
<aixm.operationalStatus>CLOSED</aixm.operationalStatus>  
</aixm.AirportHelicopterAvailability>  
</aixm.availability>  
</aixm.AirportHelicopterTimeSlice>  
</aixm.timeSlice>  
</aixm.AirportHelicopter>  
</message.hasMember>
```

ACY AD CLSD DUE TO SNOW

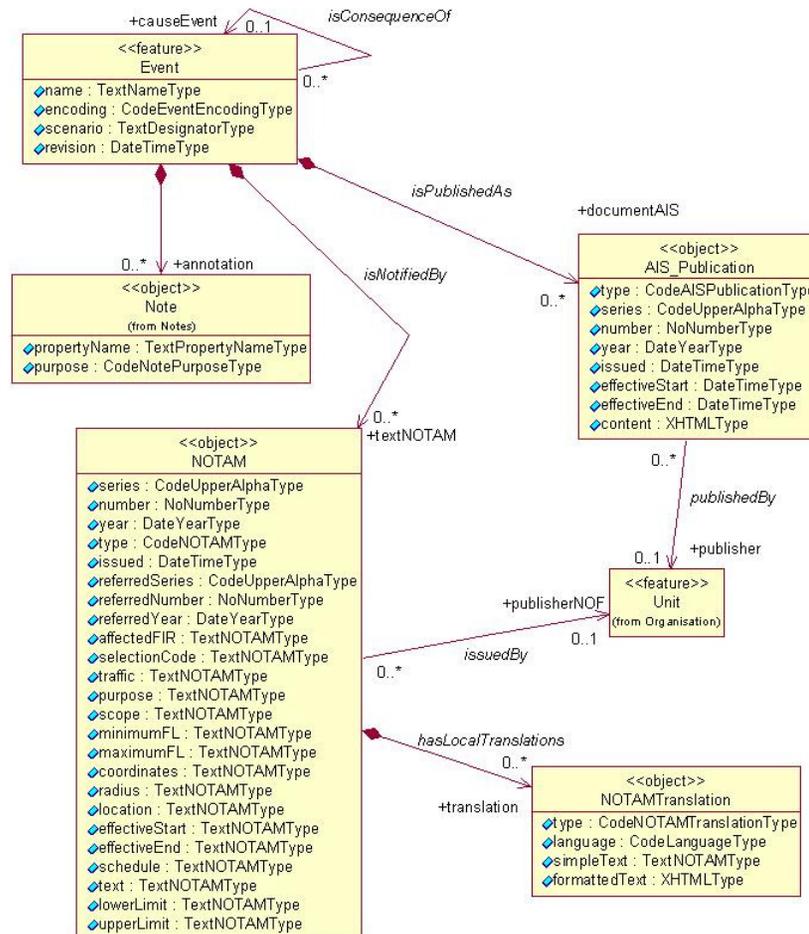


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Aeronautical Information Exchange Model



Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)



- AIXM is designed to enable the management and distribution of Aeronautical Information Services (AIS) data through the use of a common exchange model

www.aixm.aero



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Benefits to using AIXM



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- Achieve neutrality against applications and their local views of the data
 - Display customized for end user
- Improved safety
 - Reduce data inconsistencies, computer readable data means fewer errors for pilots and other users
 - Automated processing of information
 - Ensure the quality of the Aeronautical Information required by modern air navigation and ATC systems
- Represents both static and dynamic data
- International Digital Harmonization
 - Establish a set of international standards and specifications for exchanging digital information



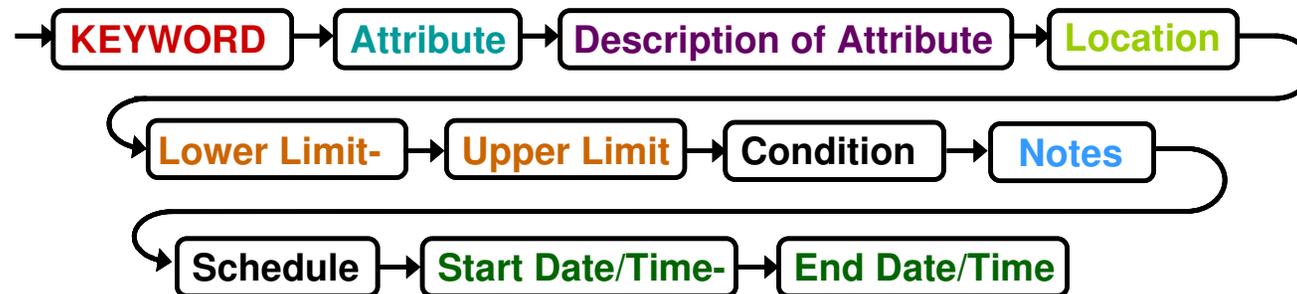
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Defining Event Scenarios



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AIXM, WXXM and FIXM)

- What is an event scenario?
 - A scenario describes the NOTAM condition or event that is being reported
 - The purpose is to capture the rules that are specific to each category of aeronautical information events



- Each scenario documents the following:
 - Minimum required data
 - AIXM Mapping of NOTAM elements
 - Translations between the digital encoding to FAA legacy, ICAO, and Plain Language
 - Business Rules
 - Sample Digital NOTAM Messages

Multiple Views of Data



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FAA Legacy Format:

!!AD IAD RWY 1C/19C CLSD WEF 201105030900-201105031600

ICAO Format:

AXXXX/XX NOTAMN

Q) KZDC/QMRLC/IV/NBO/A/000/999/3856N07727W005

A) KIAD

B) 1105030400

C) 1105031600

E) RWY 1C/19C CLSD

Plain Language Format:

Issuing Airport: (IAD) Washington Dulles Intl

NOTAM Number: XX/XXX

Effective Time Frame

Beginning: Tuesday, May 3, 2011 0400 (UTC)

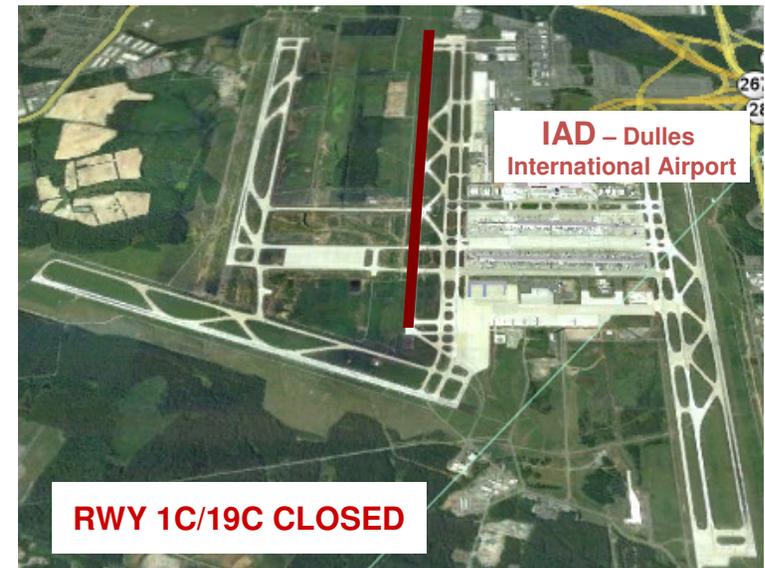
Ending: Tuesday, May 3, 2011 1600 (UTC)

Affected Areas

Runway: 1C/19C

Operating Status: Closed

Graphical Format:



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International Collaboration



- Two areas of International Collaboration
 - Aeronautical Information Exchange Model (AIXM)
 - Defining Event Scenarios for Digital NOTAMs
 - Digital NOTAM Focus Groups – collaboration between the FAA, EUROCONTROL, ECAC Member States, airlines, and industry
 - Detailed description of the Event Scenarios and their encoding as a Digital NOTAM (using AIXM version 5.1)
- Benefits
 - Establish a set of international standards and specifications for exchanging digital information
 - Efficient exchange of NOTAM information between operational systems
- Goal
 - Enable the machines that assist the specialist to provide a common and accurate view of the aeronautical 4D environment

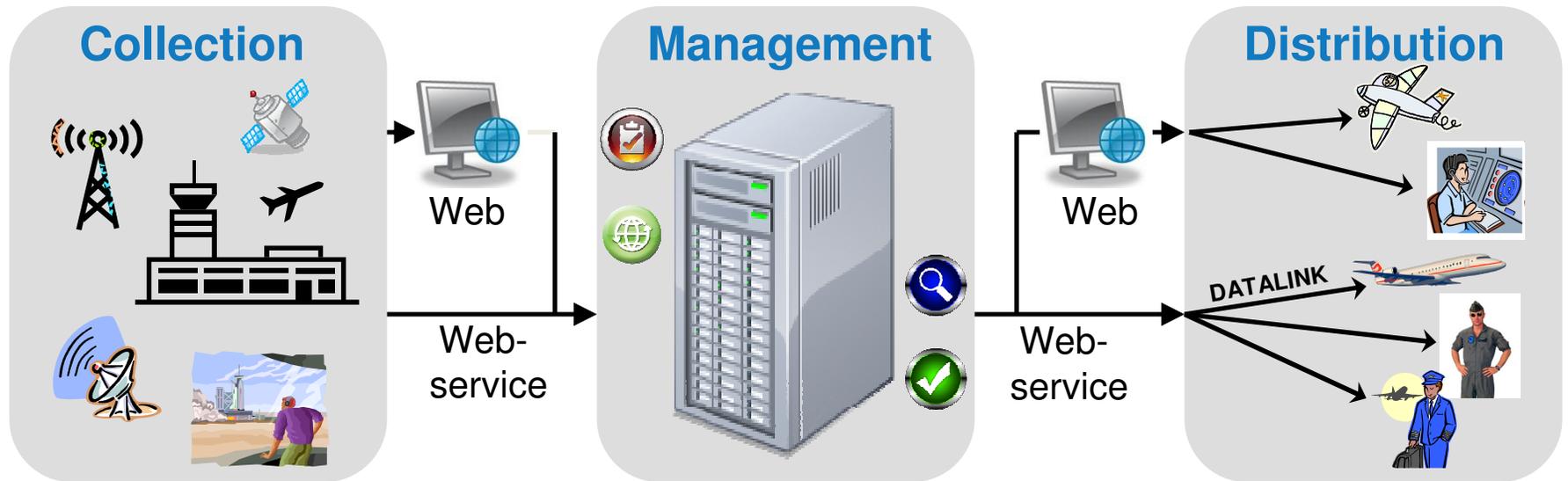


http://www.aixm.aero/public/subsite_homepage/homepage.html

FNS Demonstration: End to End Digital NOTAMs



Air Transportation Information
Exchange Conference - (featuring
AIXM, WXXM and FIXM)



Originate NOTAMs at the Source

Digitally Capture
Temporary Hazard
Information

Integrate Permanent and Temporary Information

Apply Business Rules,
Validate Data,
Translate, and Publish

Distribute NOTAMs to the Users

Electronic Distribution to
FAA customers,
Computer Readable



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FNS Demo: NOTAM Origination



Air Transportation Information Exchange Conference - (featuring AIMX, WXXM and FIXM)

US Digital NOTAM System | Federal Aviation Administration... | NOTAM Manager | Feature Manager | User Administration | My Profile | Preferences | Feedback | Help | Logout

Federal Aviation Administration | Test System | Digital - AIM | NOTAM - Manager | Shaelynn Hales | AUG 18 2011 THU 2357 UTC

New | Cancel NOTAM | Replace | Copy | Edit | Delete | Error Check | Save as Draft | View Change Log | Submit | Refresh

Page 1 of 1

Keyword	Designator	Condition	Number	Start Date UTC	End Date UTC	Status
Aerodrome	ACY	Beacon Status	-	07/15/2011 1726	07/30/2011 1726	Draft
Communication	-	Free Form	07/055	07/22/2011 1929		Active
Apron	FAA EXPERIMENTAL RAMP	Personnel and Equipment Working	-	07/25/2011 1312	07/29/2011 2100	Draft
Obstruction	-	Tower Light Outage	-	07/28/2011 1836	08/12/2011 1836	Error Activating
Runway	13/31	Ground Lighting Status	-	08/01/2011 1404	08/04/2011 1210	Error Activating
Taxiway	G	Construction Status	-	08/10/2011 1412	08/10/2011 1210	Draft
Apron	FAA EXPERIMENTAL RAMP	Ground Lighting Status	-	08/01/2011 1926	08/31/2011 2100	Error Activating
Taxiway	D	Construction Status	-	08/02/2011 1000	08/08/2011 1000	Draft
Runway	4/22	Free Form	-	08/02/2011 1505	08/26/2011 1212	Activation In Progress
Apron	ANG ALERT RAMP	Free Form	-	08/02/2011 1517	08/11/2011 1212	Activation In Progress
Taxiway	B	Free Form	-	08/05/2011 2100	08/24/2011 1210	Activation In Progress
Runway	13/31	Free Form	-	08/05/2011 2101	08/17/2011 1210	Activation In Progress
Taxiway	N	Free Form	-	08/05/2011 2102	08/24/2011 1210	Activation In Progress
Runway	4/22	Braking Action	-	08/08/2011 2019	08/09/2011 2019	Draft
Apron	FAM RAMP	Closure	08/012	08/10/2011 1347	08/19/2011 1212	Active
Runway	13/31	Free Form	-	08/10/2011 1351	08/19/2011 1212	Activation In Progress
Runway	13/31	Ground Lighting Status	08/014	08/10/2011 2100	08/25/2011 2100	Active
Runway	4/22	Closure	08/015	08/10/2011 2300	08/19/2011 2300	Active
Taxiway	D	Designated Non-Movement Area	08/013	08/10/2011 2349	08/24/2011 1210	Active
Aerodrome	ACY	Free Form	-	08/11/2011 1843	08/24/2011 1210	Activation In Progress
Apron	ANG ALERT RAMP	Personnel and Equipment Working	08/030	08/16/2011 0238	08/25/2011 1210	Active
Apron	COMMERCIAL RAMP	Ground Markings Status	08/032	08/16/2011 0320	08/30/2011 2100	Active
Aerodrome	ACY	Free Form	-	08/16/2011 1620	08/30/2011 1210	Activation In Progress
Obstacle	-	Free Form	-	08/16/2011 1622	08/30/2011 1210	Activation In Progress
Obstruction	-	Free Form	-	08/16/2011 1638	08/23/2011 1210	Activation In Progress
Obstruction		Tower Light Outage	-	08/16/2011 1747	08/31/2011 1747	Draft
Obstruction		Tower Light Outage	-	08/16/2011 2018	08/31/2011 2018	Draft
Apron	FAA EXPERIMENTAL RAMP	Personnel and Equipment Working	08/031	08/17/2011 0317	08/25/2011 1012	Active
Obstruction	-	Tower Light Outage	08/036	08/17/2011 1000	09/01/2011 1000	Active
Apron	FAA EXPERIMENTAL RAMP	Free Form	-	08/17/2011 1200	08/25/2011 1210	System Error
Apron	ALL RAMPS	Ground Lighting Status	-	08/17/2011 1942	08/31/2011 1210	Draft
Apron	FAA RAMP	Ground Lighting Status	08/052	08/18/2011 0138	08/19/2011 1313	Active
Taxiway	C	Designated Non-Movement Area	-	08/19/2011 1000	08/31/2011 1200	Draft

Active filters: Keywords = Keyword, Status = All [33 Records]

Connected to NOTAM Manager | Page 1 of 1



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FNS Demo: NOTAM Origination



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Scenario Selector

Keyword (10 / 9)

- Aerodrome (0 / 1)
- Apron/Ramp (5 / 2)
- Obstruction (1 / 2)
- Runway (2 / 1)**
- Taxiway (1 / 3)

Runway- Select a Designator

4/22

- RWY 04/22
- RWY 04
- RWY 22
- RWY 13/31
- RWY 13
- RWY 31

Select Scenario

- Braking Action
- Closure**
- Construction Status
- Ground Lighting Status
- Ground Marking Status
- Lighted Sign Status
- Lights Obscured

Create NOTAM

A map showing the Atlantic City International Airport with runways highlighted in black and red. The map includes surrounding roads like County Rd 575, U.S. Highway 30, and Atlantic City Expy (Toll road). Landmarks like Laurel Memorial Cemetery and Atlantic City Reservoir are also visible. A search bar and navigation controls are present on the left side of the map.

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FNS Demo: NOTAM Origination



Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)

NOTAM Editor - Scenario: Closure

Properties | Prior Permission | Comments

Property	Temporary Value	Permanent Value
Runway Status:	CLOSED	OPEN

Restrictions (Runway Closed For)

Operations: Aircraft Type:

Aircraft Weight:
Aircraft Wingspan Greater Than:

Property	Temporary Value	Permanent Value
Runway Status:	CLOSED	OPEN

Restrictions (F) No Records

Exceptions (Runway Open For)

Operations: Aircraft Type:

Aircraft Weight: lb Aircraft Speed: KTS
Aircraft Wingspan Greater Than: ft Aircraft Wingspan Less Than: ft

Add Reset

Exceptions (Runway Open For)	Delete
No Records	No Records

Due To Reason:

Period of Validity

Start Date (UTC) End Date (UTC)

Start Upon Activation

MM/dd/yyyy hhmm MM/dd/yyyy hhmm

Domestic ICAO Plain Language
IACY XXXXXX ACY RWY 4/22 CLSD

NOTAM template options are tied back to the AIXM attributes per the NOTAM Event Scenario definitions.



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FNS Demo: NOTAM Origination



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AIXM, WXXM and FIXM)

NOTAM Editor - Scenario: Closure

Properties Prior Permission Comments

Domestic ICAO Plain Language

!ACY XX/XXX ACY RWY 4/22 CLSD WEF 1108190003-1108211600

Domestic ICAO Plain Language

XX/XXX NOTAMN
Q) KZDC/QMRLC/IV/NBO/A /000/999/3927N07434W005
A) KACY (ACY)
B) 1108190003
C) 1108211600
E) RWY 4/22 CLSD

Domestic ICAO Plain Language

Issuing Airport: (ACY) Atlantic City Intl
NOTAM Number: XX/XXX
Effective Time Frame
Beginning: Friday, August 19, 2011 0003 (UTC)
Ending: Sunday, August 21, 2011 1600 (UTC)
Affected Areas
Runway: 4/22
Operating Status: Closed

Except
Due To
Reasc

Period of validity

Start Date (UTC) End Date (UTC)

Start Upon Activation

MM/dd/yyyy hhmm MM/dd/yyyy hhmm

NOTAMs are translated to Domestic, ICAO, and Plain Language formats as defined in the NOTAM Event Scenarios.



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FNS Demo: NOTAM Origination



Air Transportation Information
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NOTAM Editor - Scenario: Closure

Properties Prior Permission Comments

Confirmation

Do you want to Activate the NOTAM?

IACY XX/XXX ACY RWY 4/22 CLSD WEF 1108190003-1108211600

Accountability: ACY
Edited by: Shaelynn Hales
Job Title: Research Analyst
Contact: 202-580-7519(Phone)

Confirmation

IACY 08/06Z ACY RWY 4/22 CLSD WEF 1108190006-1108211600

Accountability: ACY
Edited by: Shaelynn Hales
Job Title: Research Analyst
Contact: 202-580-7519(Phone)

NOTAM Submission Successful!

Close

Start Date (UTC)
 Start Upon Activation
MM/dd/yyyy hhmm

Com

Web services provide immediate feedback on validation and submission of digital NOTAMs.



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FNS Demo: NOTAM Origination



Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)

US Digital NOTAM System | Federal Aviation Administration | NOTAM Manager | Feature Manager | User Administration | My Profile | Preferences | Feedback | Help | Logout

Federal Aviation Administration | Test System | Digital - AIM | NOTAM - Manager | Shaelynn Hales | AUG 18 2011 THU 2357 UTC

NOTAM Summary

Keyword	Designator	Condition	Number	Start Date UTC	End Date UTC	Status
Runway	4/22	Closure	08/062	08/19/2011 0006	08/21/2011 1600	Active
Apron	FAA RAMP	Ground Lighting Status	08/052	08/18/2011 0138	08/19/2011 1313	Active
Apron	ALL RAMPS	Ground Lighting Status	-	08/17/2011 1942	08/31/2011 1210	Draft

NOTAM Details

NOTAM Status: ACTIVE

Domestic: IACY 08/062 ACY RWY 4/22 CLSD WEF 1108190006-1108211600

ICAO Format	Plain Text
08/062 NOTAMN Q) KZDC/QMRLC/IV/NBO/A /000/999/3927N07434W005 A) KACY (ACY) B) 1108190006 C) 1108211600 E) RWY 4/22 CLSD	Issuing Airport: (ACY) Atlantic City Intl NOTAM Number: 08/062 Effective Time Frame Beginning: Friday, August 19, 2011 0006 (UTC) Ending: Sunday, August 21, 2011 1600 (UTC) Affected Areas Runway: 4/22 Operating Status: Closed

Created by Shaelynn Hales, (Tel: 202-580-7519; Fax: ; Radio:)

Operating Status: Closed

Active filters: Keywords = Keyword, Status = All [33 Records] | Connected to NOTAM Manager | Page 1 of 1

NOTAM Originators can manage their NOTAMs within FNS.



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FNS Demo: NOTAM Distribution



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Free Text Search Disclaimer Feedback External Links

Digital - AIM | NOTAM - Search

UTC: Fri 19 Aug 2011 0112

1 to 10 of 10



NOTAM Search

Location search on location(s) ACY

Search By

- Location
- Accountability
- Geography

(Example: JFK, IAD)

Clear Search

Location	NOTAM #	Class	Start Date UTC	End Date UTC	NOTAM Condition
ACY	07/055	Communication	07/22/2011 1929		COM VOR VOICE UNMON
ACY	08/036	Obstruction	08/17/2011 1000	09/01/2011 1000	OBST TOWER 241 (180 AGL) 0.5 N LGTS OTS WEF 1108171000-1109011000
ACY	08/014	Aerodrome	08/10/2011 2100	08/25/2011 2100	RWY 13/31 ELEV GUARD LGTS NONSTD WEF 1108102100-1108252100
ACY	08/030	Aerodrome	08/16/2011 0238	08/25/2011 1210	APRON ANG ALERT RAMP PAEW DISABLD ACFT ADJ SE SIDE LGTD AND BARRICADED WEF 1108160238-11082512
ACY	08/031	Aerodrome	08/17/2011 0317	08/25/2011 1012	APRON FAA EXPERIMENTAL RAMP PAEW CONTROLLED BURN/HEAVY SMOKE ADJ SE SIDE LGTD AND BARRICA
ACY	08/013	Aerodrome	08/10/2011 2349	08/24/2011 1210	TWY D NON-MOVEMENT AREA BTN ANG RAMP AND TWY A WEF 1108102349-1108241210
ACY	08/062	Aerodrome	08/19/2011 0006	08/21/2011 1600	RWY 4/22 CLSD WEF 1108190006-1108211600
ACY	08/015	Aerodrome	08/10/2011 2300	08/19/2011 2300	RWY 4/22 CLSD WEF 1108102300-1108192300
ACY	08/052	Aerodrome	08/18/2011 0138	08/19/2011 1313	APRON FAA RAMP LGTS OTS WEF 1108180138-1108191313
ACY	08/012	Aerodrome	08/10/2011 1347	08/19/2011 1212	APRON FAM RAMP CLSD WEF 1108101347-1108191212

NOTAM Search

Search By

- Location
- Accountability
- Geography

(Example: JFK, IAD)

ACY

Clear

Search

Digital NOTAMs are able to be searched, sorted and filtered to provide context to NOTAM users.



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FNS Demo: NOTAM Distribution



Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)



Free Text Search Disclaimer Feedback External Links

Digital - AIM | NOTAM - Search

UTC: Fri 19 Aug 2011 0112

1 to 10 of 10



NOTAM Search

Location search on location(s) ACY

Search By

- Location
- Accountability
- Geography

(Example: JFK, IAD)

Clear

Search

Location	NOTAM #	Class	Start Date UTC	End Date UTC	NOTAM Condition
ACY	07/055	Communication	07/22/2011 1929		COM VOR VOICE UNMON
ACY	08/036	Obstruction	08/17/2011 1000	09/01/2011 1000	OBST TOWER 241 (180 AGL) 0.5 N LGTS OTS WEF 1108171000-1109011000
ACY	08/014	Aerodrome	08/10/2011 2100	08/25/2011 2100	RWY 13/31 ELEV GUARD LGTS NONSTD WEF 1108102100-1108252100
ACY	08/030	Aerodrome	08/16/2011 0238	08/25/2011 1210	APRON ANG ALERT RAMP PAEW DISABLD ACFT ADJ SE SIDE LGTD AND BARRICADED WEF 1108160238-11082512
ACY	08/031	Aerodrome	08/17/2011 0317	08/25/2011 1012	APRON FAA EXPERIMENTAL RAMP PAEW CONTROLLED BURN/HEAVY SMOKE ADJ SE SIDE LGTD AND BARRICA
ACY	08/013	Aerodrome	08/10/2011 2349	08/24/2011 1210	TWY D NON-MOVEMENT AREA BTN ANG RAMP AND TWY A WEF 1108102349-1108241210
ACY	08/062	Aerodrome	08/19/2011 0006	08/21/2011 1600	RWY 4/22 CLSD WEF 1108190006-1108211600
ACY	08/015	Aerodrome	08/10/2011 2300	08/19/2011 2300	RWY 4/22 CLSD WEF 1108102300-1108192300

NOTAM: ACY-08/062

ACY-08/062

About ACY (KACY)

ATLANTIC CITY INTL

NOTAM #: 08/062 Effective: 19 Aug 2011 0006 UTC
Facility: ACY Until: 21 Aug 2011 1600 UTC
Class: Aerodrome Status: Active

Domestic ICAO Plain Language

!ACY 08/062 ACY RWY 4/22 CLSD WEF 1108190006-1108211600

Additional information is provided to the user about NOTAMs they are interested in.



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FNS Demo: NOTAM Distribution



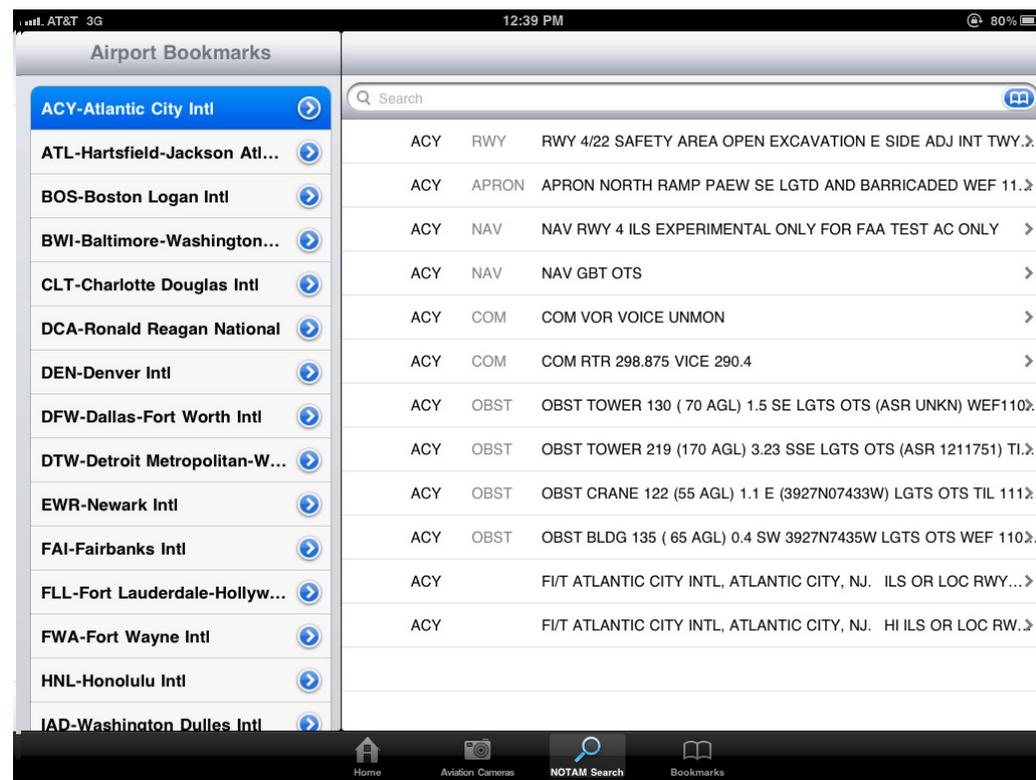
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AIXM, WXXM and FIXM)



Standards based web services can provide Digital NOTAM information to a variety of end applications, including mobile devices.

Supported by Standards

- AIXM Distribution Service
- JSON Adapter

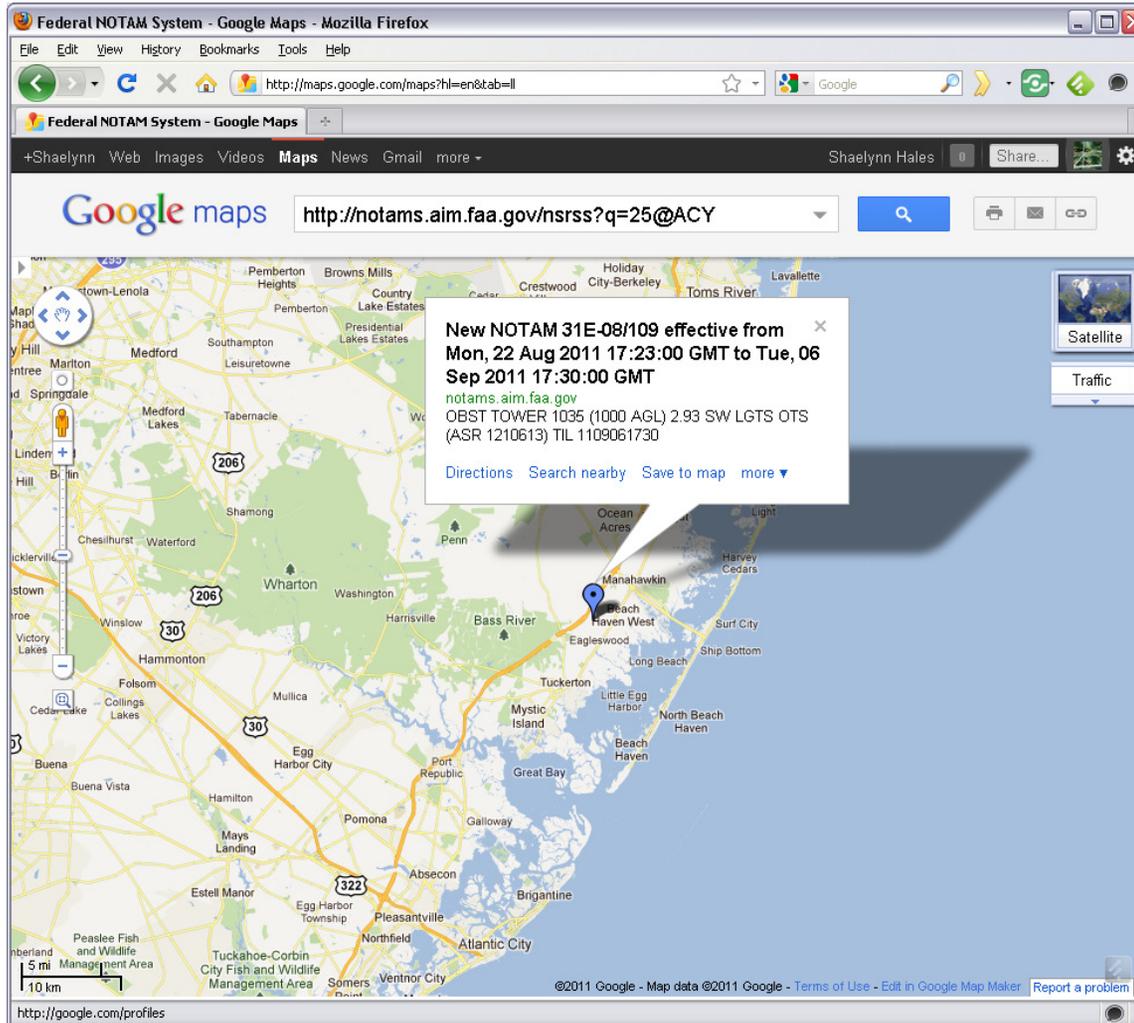


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FNS Demo: NOTAM Distribution



Air Transportation Information
Exchange Conference - (featuring
AIXM, WXXM and FIXM)



With standard services, there is a wide variety of end uses that can help provide users with NOTAM information.

Supported by Standards

- GeoRSS



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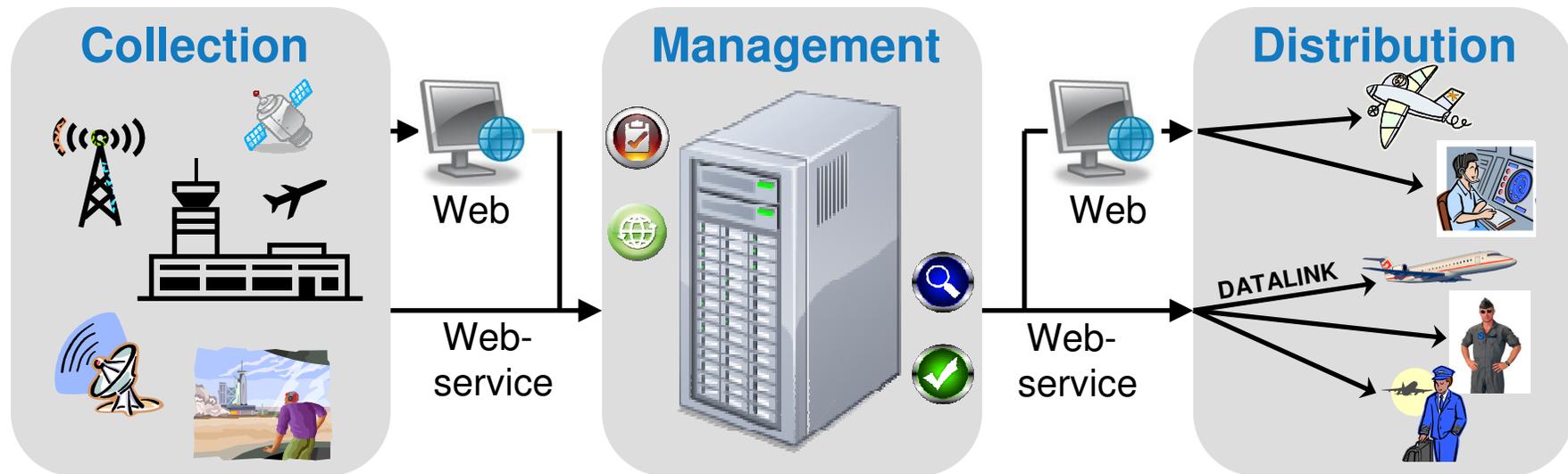


Summary / Conclusion

Standards such as AIXM support Digital NOTAMs

from direct digital capture of NOTAM
information by originators...

through digital distribution to end users within
the global airspace system...



Questions & Answers / Feedback



Air Transportation Information
Exchange Conference - (featuring
AIXM, WXXM and FIXM)



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More Information / Contacts



Air Transportation Information
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